



## Pharmaceutical Standardization

# Pharmacognostical and preliminary physico-chemical profiles of *Blepharispermum subsessile* DC. root

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### Abstract

**Introduction:** *Blepharispermum subsessile* DC. is a folklore medicinal herb, found in Odisha, Karnataka, Madhya Pradesh, and Maharashtra. It is locally known as *Rasnajhadi* in Odisha and its roots are being used as *Rasna* in treating rheumatic, gynecological, nervous disorders. In spite of its high medicinal as well as market values, the pharmacognostical characters of its root is not reported till date. **Aim:** To evaluate pharmacognostical and preliminary physico-chemical profiles of *B. subsessile* root. **Materials and Methods:** Roots of *B. subsessile* were collected from Odisha; its macroscopic, microscopic, powder characters and preliminary physico-chemical characters were studied following standard procedures. **Results:** Microscopically, outer multilayered lignified cork cells, cortex, border pitted xylem vessels, tracheids, isolated or groups of thick-walled xylem fibres were seen. Physico-chemical parameters showed that water soluble extractive value (31.3%) is more than alcohol soluble extractive value (23.2%) and 5.5 pH value, etc. **Conclusion:** The findings of the study will be useful in the identification and standardization of the *B. subsessile* root.

**Key words:** Asteraceae, *Blepharispermum subsessile* DC., ethnomedicine, pharmacognosy, *Rasna*, root

## Introduction

India has rich floristic and ethnic diversity. *Blepharispermum subsessile* DC., an extra pharmacopeial folklore medicinal plant, is a "Healing herb," known and marketed as *Rasnajhadi* in Odisha, is more frequent in the forests, north of Indravati river of Bastar District, distributed in Madhya Pradesh, Maharashtra, Karnataka, and Odisha. An ethno botanical study reports the uses of its root in the management of various diseases. Socio-religious customs of Bastar region, i.e. Raj Gondas, Murias, Bhatra, uses decoction of *Rasnajhadi*, on 3<sup>rd</sup> day of menstruation and after delivery.<sup>[1]</sup> Decoction as well as powder of root is used in nervous disorders,<sup>[2]</sup> whole plant is used in *Krimiroga* (worms), *Atisara* (diarrhea) and *Udarshula* (stomach-ache),<sup>[3]</sup> rheumatic affections,<sup>[4,5]</sup> diarrhea,<sup>[6]</sup> skin diseases,<sup>[7]</sup> eye troubles, back ache due to rheumatism,<sup>[8]</sup> and irregular menstruation.<sup>[9]</sup> The pharmacognostical characters of its leaf<sup>[10]</sup> and stem<sup>[11]</sup> have been reported. In spite of its high medicinal as well as market value, the pharmacognostical characters of its root is not reported till date. Hence, the

present study planned to evaluate pharmacognostical profiles of its root, which includes macroscopic, microscopic characters, and preliminary physico-chemical analysis.

## Materials and Methods

### Collection and authentication

*Rasnajhadi*, growing in Gurudongmar medicinal plants conservation area of Nuapada district of Odisha, India, was identified as *B. subsessile* DC. belonging to *Asteraceae* family on the basis of its morphological characters, comparing with the reported characters mentioned in Flora of Orissa,<sup>[12]</sup> and with the help of local taxonomist. The fresh plant sample was collected from its natural habitat during October 2011 and has been

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preserved with voucher specimen (no. 37325) in pharmacognosy laboratory. The collected plant samples were shaken to remove adherent soil and dirt. The roots were separated from the stem, washed under running fresh water. Few pieces were stored in the solution of alcohol: acetic acid: formalin in the ratio of (90:5:5)<sup>[13]</sup> to utilize them for microscopic studies. Remaining roots were washed, shade dried, powdered, passed through mesh no. 80, and preserved in an air-tight glass container and utilized for powder microscopy and preliminary physico-chemical analysis.

### Pharmacognostic studies

Morphological characters were studied by observing the root as such and with the help of dissecting microscope. For detailed microscopical observation, free-hand thin transverse sections (TS) were taken, cleared with chloral hydrate, and observed for the presence of any crystals. Then, these sections were stained with phloroglucinol and conc. hydrochloric acid to notice lignified elements such as fibres and vessels.<sup>[14]</sup> Photographs of the sections were taken with the help of Canon digital camera attached to Carl Zeiss trinocular microscope. Powder characters were observed with above mentioned methods.

### Physico-chemical evaluation

The dried sample of the root was used for the preliminary physico-chemical investigations by the standard procedure adopted from Ayurvedic Pharmacopoeia of India (API).<sup>[15]</sup>

## Results and Discussion

### Macroscopic examination

Drug consist of cylindrical unbranched straight or slightly bent or tortuous pieces of roots, 2.5–5.5 cm in length and 0.3–0.5 cm in diameter, longitudinally ridged, wrinkled and fissured, show few transversely running lenticels, transversely cracked at places exfoliated exhibiting the inner narrow yellow wood. Fracture is short, externally earthy brown in color, internally yellowish. Some pieces show the crown with cluster of aerial stem arising from its upper surface and roots from the lower surface [Figure 1].

### Microscopic examination

Diagrammatic TS of the root is circular in outline with irregular margins, show outer cork, cortex and phloem, xylem abruptly interpreted with phloem, and makes second layer of xylem towards the center.

Detailed TS shows, outermost cork cells which are dark brown, suberized, compressed, and running irregularly; middle cork cells lying underneath, these are lignified, 3–4 layered, and square; innermost cork cells consist of narrow suberized cells which are compressed and running tangentially. Cortex is narrow, parenchymatous, and embedded at places with simple starch grains. Phloem consisting of 7–10 rows, consisting of phloem parenchyma, sieve tubes and companion cells, traversed with isolated lignified thin walled stone cells, and oil cells embedded with yellowish brown coloring matter. At places, phloem penetrates inside the xylem and embedded with isolated thick-walled fibres. Xylem is wide consisting of xylem vessels, which are isolated or in group, medullary rays are multiseriate, getting wider at places, and occasionally shows cleft in them. Patches of interxylary phloem and intervacular pits are traversing throughout the xylem and are embedded with isolated

fibres. Inner toward the center, band of xylem forming ring along with parenchyma and some fibers followed by band of phloem leads into anomalous growth, leaving centrally some parenchyma cells heavily filled with tannin material [Figures 2 and 3].

### Powder microscopy

Organoleptic characters of powder show brownish black color, aromatic odor, oily and bitter taste, and rough touch.



Figure 1: *Blepharispermum subsessile* plant in natural habitat and roots

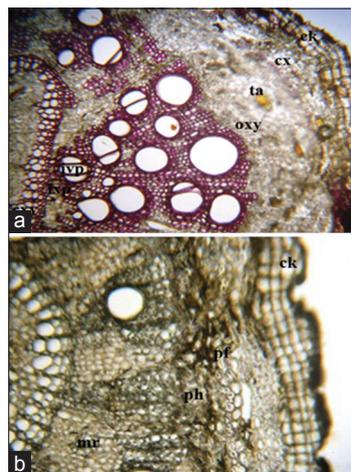


Figure 2: Transverse section of root, (a) ck: Cork, cx: Cortex, t: Tannin, oxy: Outer xylem, ixp: Interxylary phloem, cxy: Central xylem with fibres; (b) ck: Cork, pf: Pericyclic fibres, ph: Phloem, mr: Medullary rays

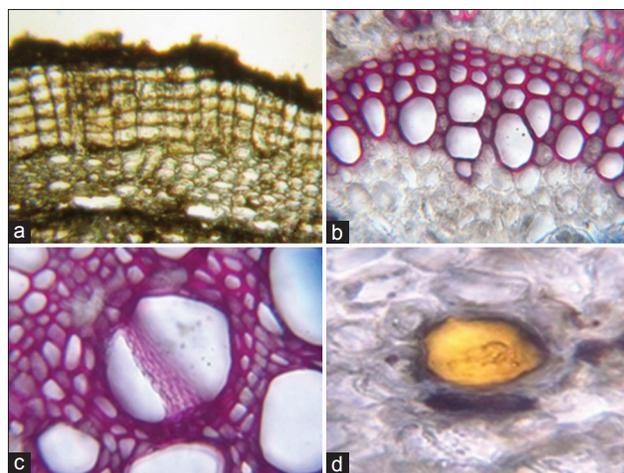
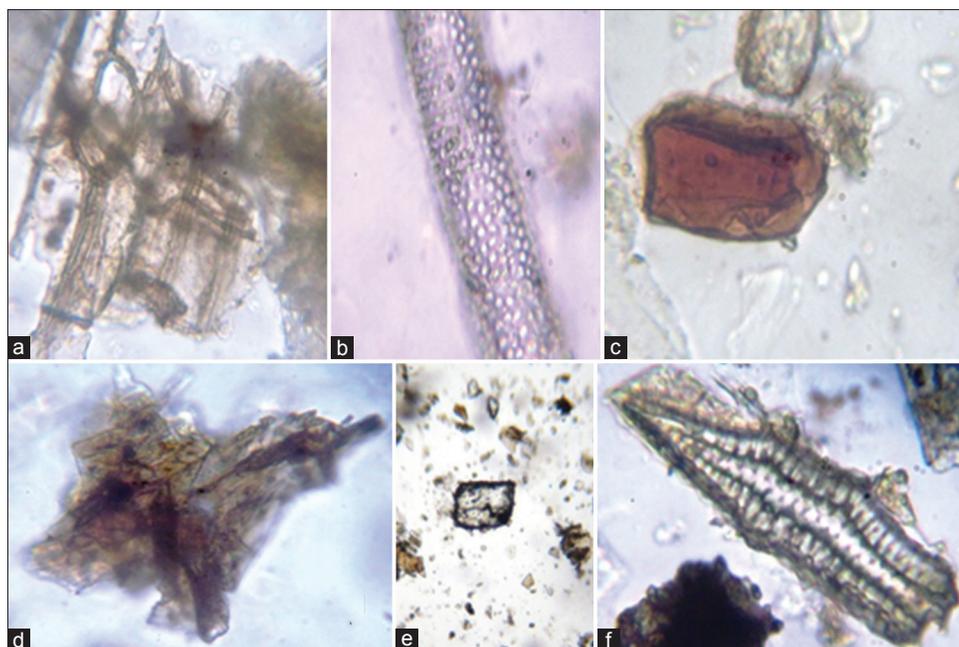


Figure 3: Transverse section in enlarged view (a) cork in surface view, (b) central xylem with xylem and phloem, (c) xylem with parenchyma and fibres, (d) tannin-containing cells



**Figure 4:** Powder microscopic characters of root (a) cork in surface view, (b) border pitted xylem vessel, (c) tannin, (d) pitted sclereids, (e) prismatic crystal, (f) coloring matter

**Table 1: Preliminary physico-chemical analysis of *Blepharispermum subsessile* root**

Parameters	<i>B. subsessile</i> root
Foreign matter	Nil
Loss on drying (% w/w)	6.65
Total ash content (% w/w)	4.05
Acid insoluble ash (% w/w)	0.5
Water soluble extractive value (% w/w)	31.3
Alcohol soluble extractive value (% w/w)	23.2
Petroleum ether soluble extractive value (% w/w)	6.11
pH in 5% aqueous solution	5.5

*B. subsessile*: *Blepharispermum subsessile*

The diagnostic characters of *B. subsessile* root powder shows, multilayered lignified cork cells in surface view, cork in transversely cut view, phloem parenchymatous cells embedded with fibres, longitudinally cut fragments of border pitted xylem vessels and tracheids, radially cut medullary rays crossing the xylem vessels, tracheids and isolated or groups of thick-walled xylem fibers, prismatic crystals, and tannin content [Figure 4].

### Preliminary physico-chemical analysis

Physico-chemical parameters of *B. subsessile* root showed total ash (4.05%), acid insoluble ash (0.5%), water soluble extractive value (31.3%) more than alcohol soluble extractive value (23.2%), and acidic pH 5.5 [Table 1].

### Conclusion

Diagnostic characters of root of *B. subsessile* DC. showed outer multilayered lignified cork cells, xylem abruptly interpreted

with phloem, interxylary phloem, border pitted xylem vessels, intervascular pits, multiseriate medullary rays, tracheids, prismatic crystals, and tannin. The results of pharmacognostical and physico-chemical parameters can be considered as reference standards in the further studies.

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### Conflicts of interest

There are no conflicts of interest.

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## हिन्दी सारांश

### ‘ब्लेफरिस्पर्मम सबसीसाईल डिसी’ का द्रव्यपरिचयात्मक परीक्षण

अमृता जाधव, रबिनारायण आचार्य, हरीशा सी.आर., विनय जे. शुक्ला, हरिमोहन चन्दोला

आधुनिक चिकित्सा विज्ञान में जनजातीय औषधि (एथनोमेडिसिनल) वनस्पतियों का अत्यंत महत्वपूर्ण योगदान है। ‘ब्लेफरिस्पर्मम सबसीसाईल डिसी’ (वंश-एस्टरेसी) वनस्पति जनजातियों द्वारा ‘‘रास्ना’’ के नाम से उपयोग में ली जाती है। जनजातियों में यह ‘‘रास्नाझडी’’ नाम से परिचित है। इसका मध्यम आकार का क्षुप होता है, जिसे उड़ीसा, मध्यप्रदेश, महाराष्ट्र और कर्नाटक के जंगलो में अल्प प्रमाण में पाया जाता है। इसका मूल आमवात, स्त्रीरोग, वातरोग में उपयुक्त है। तथा यह वनस्पति व्रणशोथ, अतिसार, उदरशूल, कृमि, नेत्ररोग, कटिशूल आदि व्याधियों में भी जनजातियों द्वारा उपयोग में लायी जाती है। अब तक यह वनस्पति उसके द्रव्यपरिचयात्मक (फार्माकोप्रोस्टिकल) विशेषताओं के लिये तथा वातनाशक कर्मों के लिये परिचित नहीं की गयी है। अतः इसे विस्तृत रूप से अभ्यास करने के लिये चुना गया। इस अभ्यास में इसके प्रयोज्यांग अर्थात् मूल का द्रव्यपरिचयात्मक (फार्माकोप्रोस्टिक) परीक्षण जिसमें मूल के विशेष अंगों का परीक्षण तथा भौतिक-रसायनिक परीक्षण किया गया है।